GARLICK, HARRISON & MARKISON
ATTORNEYS AT LAW
P. O. BOX 160727
AUSTIN, TEXAS 78716-0727
TELEPHONE (972) 412-5549 BARBARA A. ADKINS, LEGAL ASSISTANT
FACSIMILE (972) 463-2078

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Commissioner for Patents

From: **Barbara Adkins, Legal Assistant for**
Timothy W. Markison, Reg. #33,534
Garlick Harrison & Markison

Re: **Serial No. 10/802,014**
Attorney Docket No. BP3274

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(1) **Petition From Requirement For Restriction Pursuant to 37 CFR 1.144 (17 pgs)**

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PATENT APPLICATION
IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Roufoogaran
Serial No: 10/802,014
Filing Date: 3/16/04
Title: RADIO FRONT END AND APPLICATIONS THEREOF

Examiner: Tran, Pablo
Art Group: 2618
Docket No: BP 3274

Date: 4/12/07

Honorable Commissioner of
Patents and Trademarks,
Alexandria, Virginia 22313

PETITION FROM REQUIREMENT FOR RESTRICTION
PURSUANT TO 37 CFR 1.144

In an Office Action mailed on 12/15/06 regarding the above-captioned patent application, the Examiner finally rejected the applicant's request for withdraw or modification of the restriction/election requirement issued in an office action mailed on 7/12/06. The applicant respectfully petitions the Director to withdraw the restriction requirement and state the following in support thereof.

1. On 7/12/06 an office action for the above referenced patent application was mailed to the applicant. In the office action, the Examiner stated that the application contains claims directed to eleven (11) patentably distinct species. The species were identified as:

Species I: Claims 1, 2, 6, 16, 17, and 21 (figures 1 and 6);
Species II: Claims 1, 3, 6, 16, 18, and 21 (figures 1 and 5);
Species III: Claims 1, 4, 6, 16, 19, and 21 (figures 1 and 7);
Species IV: Claims 1, 5, 6, 16, 20, and 21 (figures 1 and 8);
Species V: Claims 1, 6, 7, 16, 21, and 22 (figures 1 and 9);
Species VI: Claims 1, 6, 8, 16, 21, and 23 (figures 1 and 4);
Species VII: Claims 9, 10, 13, 24, 25, and 28 (figures 4 and 8);

Species VIII: Claims 9, 11, 13, 24, 25, and 28 (figures 4 and 7);
Species IX: Claims 9, 12, 13, 24, 27, and 28 (figures 4 and 5);
Species X: Claims 9, 13, 14, 24, 28, and 29 (figures 4 and 9); and
Species XI: Claims 9, 13, 15, 24, 28, and 30 (figures 4 and 3).

2. In a response to the 7/12/06 office action, the applicant requested a withdrawal of the restriction or at least a modification of the restriction requirement and made a provisional election of claims 1, 6, 16, and 21.

3. In support of the applicant's request for withdraw of restriction, the applicant stated claims 1, 9, 16, and 24 are independent claims; where claims 2-8 depend from claim 1, claims 10-15 depend from claim 9, claims 17-23 depend from claim 16, and claims 25-30 depend from claim 24. In the above referenced species grouping, the Examiner has placed claims 1, 6, 16, and 21 in each of specie groups I – VI and has placed claims 9, 13, 24, and 28 in each of specie groups VII-XI.

MPEP 806.04(d) states, in part, "in general, a generic claim ... must comprehend within its confines the organization covered in each of the species", and MPEP 806.04 (e) states, in part, that "a claim may include two or more of the disclosed embodiments within the breadth and scope of definition (and thus be designated *a generic or genus claim)*". In accordance with this definition and as grouped by the Examiner, claims 1, 9, 16, and 24 are generic claims. Thus, election to a species in groups I-VI or in groups VII-XI is inappropriate.

Further, 35 USC 112, fourth paragraph, states, in part, "a claim in dependent form shall contain ... a further limitation of the subject matter claimed ... [and] shall be construed to incorporate by reference all the limitations of the claim to which it refers". In the present patent application, claims 2-8 properly dependent from claim 1, claims 10-15 properly dependent from claim 9, claims 17-23 properly dependent from claim 16, and claims 25-30 properly dependent from claim 24, where each of the independent claims corresponds to at least one disclosed embodiment of the invention. Thus, by definition,

dependent claims 2-8, 10-15, 17-23, and 25-30 provide additional limitations to the at least one embodiment covered by independent claims 1, 9, 16, and 24. As such, independent claims 1, 9, 16, and 24 and dependent claims 2-8, 10-15, 17-23, and 25-30 are providing varying breadth and/or scope of definition of the at least one disclosed embodiment.

MPEP 806.03 states, in part, "where the claims of an application define the same essential characteristics of a *single* disclosed embodiment of an invention, restriction therebetween should never be required. This is because the claims are but different definitions of the same disclosed subject matter, varying in breadth or scope of definition".

Accordingly, claim 1-30 should not be subject to restriction since they are different definitions of the same disclosed subject matter, varying in breadth or scope of definition.

4. The applicant contends that a restriction in this patent application is improper and requests the Director withdraw the restriction.

5. A copy of the claims as originally filed are attached hereto.

6. No petition fee is indicated in 37 CFR 1.144. If, however, a petition fee is due, the Commissioner is authorized to charge such fee to Deposit Account 50-1415.

RESPECTFULLY SUBMITTED,

By: /Timothy W. Markison reg. 33,534/

Timothy W. Markison
Phone: (808) 665-1725
Fax No. (808) 665-1728

CERTIFICATE OF FACSIMILE

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04/12/2007
Date

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1. (original) A radio front end comprises:

a transformer having a first winding and a second winding, wherein the first winding is operably coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier; and

an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode.

2. (original) The radio front end of claim 1, wherein the adjustable load comprises:

a first variable capacitor circuit operably coupled from one node of the second winding to a circuit ground, wherein the first variable capacitor circuit provides a first capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal; and

a second variable capacitor circuit operably coupled from another node of the second winding to the circuit ground, wherein the second variable capacitor circuit provides the first capacitance value in response to the first impedance selection signal and provides the second capacitance value in response to the second impedance selection signal.

3. (original) The radio front end of claim 1, wherein the adjustable load comprises:

a variable capacitor circuit operably coupled from a first node of the second winding to a second node of the second winding, wherein the variable capacitor circuit provides a first

capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal

4. (original) The radio front end of claim 1, wherein the adjustable load comprises:

a first variable inductor circuit operably coupled in series with one node of the second winding, wherein the first variable inductor circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal; and

a second variable inductor circuit operably coupled in series with another node of the second winding, wherein the second variable inductor circuit provides the first inductance value in response to the first impedance selection signal and provides the second inductance value in response to the second impedance selection signal.

5. (original) The radio front end of claim 1, wherein the adjustable load comprises:

a first variable inductance circuit operably coupled from one node of the second winding to a circuit ground, wherein the first variable inductance circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal; and

a second variable inductor circuit operably coupled from another node of the second winding to the circuit ground, wherein the second variable inductor circuit provides the first inductance value in response to the first impedance selection signal and provides the second inductance value in response to the second impedance selection signal.

6. (original) The radio front end of claim 1 further comprises:

determining the load impedance selection signal based on at least one of: impedance matching of load on single-ending winding, output power requirements, and receiver sensitivity.

7. (original) The radio front end of claim 1 further comprises:

the second winding of the transformer includes a first set of taps and a second set of taps, wherein the first set of taps is coupled to a low noise amplifier and the second set of taps is coupled to a power amplifier; and

wherein the adjustable load includes:

a first adjustable load circuit operably coupled to one tap of the first set of taps, wherein the first adjustable load circuit provides a first portion of the first impedance in response to the first impedance selection signal and provides a first portion of the second impedance in response to the second impedance selection signal;

a second adjustable load circuit operably coupled to a second tap of the first set of taps, wherein the second adjustable load circuit provides a second portion of the first impedance in response to the first impedance selection signal and provides a second portion of the second impedance in response to the second impedance selection signal;

a third adjustable load circuit operably coupled to one tap of the second set of taps, wherein the third adjustable load circuit provides a third portion of the first impedance in response to the first impedance selection signal and provides a third portion of the second impedance in response to the second impedance selection signal; and

a fourth adjustable load circuit operably coupled to a second tap of the second set of taps, wherein the fourth adjustable load circuit provides a fourth portion of the first impedance in response to the first impedance selection signal and provides a fourth portion of the second impedance in response to the second impedance selection signal.

8. (original) The radio front end of claim 1 further comprises:

a second adjustable load coupled to the first winding, wherein the second adjustable load provides a third impedance in response to the first impedance selection signal and provides a fourth impedance in response to the second impedance selection signal.

9. (original) A radio front end comprises:

a transformer having a first winding and a second winding, wherein the first winding is operably coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier; and

an adjustable load operably coupled to the first winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode.

10. (original) The radio front end of claim 9, wherein the adjustable load comprises:

a variable capacitor circuit operably coupled from a first node of the first winding to a second node of the first winding, wherein the variable capacitor circuit provides a first capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal

11. (original) The radio front end of claim 9, wherein the adjustable load comprises:

a variable inductor circuit operably coupled in series with one node of the first winding, wherein the variable inductor circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal.

12. (original) The radio front end of claim 9, wherein the adjustable load comprises:

a variable inductance circuit operably coupled from one node of the first winding to a circuit ground, wherein the variable inductance circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal.

13. (original) The radio front end of claim 9 further comprises:

determining the load impedance selection signal based on at least one of: impedance matching of load on single-ending winding, output power requirements, and receiver sensitivity.

14. (original) The radio front end of claim 9 further comprises:

the second winding of the transformer includes a first set of taps and a second set of taps, wherein the first set of taps is coupled to a low noise amplifier and the second set of taps is coupled to a power amplifier;

a first adjustable load circuit operably coupled to one tap of the first set of taps, wherein the first adjustable load circuit provides a first portion of a third impedance in response to the first impedance selection signal and provides a first portion of a fourth impedance in response to the second impedance selection signal;

a second adjustable load circuit operably coupled to a second tap of the first set of taps, wherein the second adjustable load circuit provides a second portion of the third impedance in response to the first impedance selection signal and provides a second portion of the fourth impedance in response to the second impedance selection signal;

a third adjustable load circuit operably coupled to one tap of the second set of taps, wherein the third adjustable load circuit provides a third portion of the third impedance in response to the first impedance selection signal and provides a third portion of the fourth impedance in response to the second impedance selection signal; and

a fourth adjustable load circuit operably coupled to a second tap of the second set of taps, wherein the fourth adjustable load circuit provides a fourth portion of the third impedance in response to the first impedance selection signal and provides a fourth portion of the fourth impedance in response to the second impedance selection signal.

15. (original) The radio front end of claim 9 further comprises:

a second adjustable load coupled to the second winding, wherein the second adjustable load provides a third impedance in response to the first impedance selection signal and provides a fourth impedance in response to the second impedance selection signal.

16. (original) A radio frequency integrated circuit (RFIC) comprises:

a radio front end operably coupled to transceiver radio frequency (RF) signals;

a low noise amplifier operably coupled to the radio front end, wherein the low noise amplifier receives inbound RF signals from the radio front end, and wherein the low noise amplifier amplifies the inbound RF signals to produce amplified inbound RF signals;

down conversion module operably coupled to convert the amplified inbound RF signals into inbound baseband signals;

baseband processing module operably coupled to convert the inbound baseband signals into inbound data and to convert outbound data into outbound baseband signals in accordance with a wireless communications protocol;

up conversion module operably coupled to convert the outbound baseband signals into outbound RF signals; and

a power amplifier operably coupled to amplify the outbound RF signals to produce amplified outbound RF signals and to provide the amplified outbound RF signals to the radio front end, wherein the radio front end includes:

a transformer having a first winding and a second winding, wherein the first winding is operably coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier; and

an adjustable load operably coupled to the second winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode.

17. (original) The RFIC of claim 16, wherein the adjustable load comprises:

a first variable capacitor circuit operably coupled from one node of the second winding to a circuit ground, wherein the first variable capacitor circuit provides a first capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal; and

a second variable capacitor circuit operably coupled from another node of the second winding to the circuit ground, wherein the second variable capacitor circuit provides the first capacitance value in response to the first impedance selection signal and provides the second capacitance value in response to the second impedance selection signal.

18. (original) The RFIC of claim 16, wherein the adjustable load comprises:

a variable capacitor circuit operably coupled from a first node of the second winding to a second node of the second winding, wherein the variable capacitor circuit provides a first capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal

19. (original) The RFIC of claim 16, wherein the adjustable load comprises:

a first variable inductor circuit operably coupled in series with one node of the second winding, wherein the first variable inductor circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal; and

a second variable inductor circuit operably coupled in series with another node of the second winding, wherein the second variable inductor circuit provides the first inductance value in response to the first impedance selection signal and provides the second inductance value in response to the second impedance selection signal.

20. (original) The RFIC of claim 16, wherein the adjustable load comprises:

a first variable inductance circuit operably coupled from one node of the second winding to a circuit ground, wherein the first variable inductance circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal; and

a second variable inductor circuit operably coupled from another node of the second winding to the circuit ground, wherein the second variable inductor circuit provides the first inductance value in response to the first impedance selection signal and provides the second inductance value in response to the second impedance selection signal.

21. (original) The RFIC of claim 16, wherein the radio front end further comprises:

determining the load impedance selection signal based on at least one of: impedance matching of load on single-ending winding, output power requirements, and receiver sensitivity.

22. (original) The RFIC of claim 16, wherein the radio front end further comprises:

the second winding of the transformer includes a first set of taps and a second set of taps, wherein the first set of taps is coupled to a low noise amplifier and the second set of taps is coupled to a power amplifier; and

wherein the adjustable load includes:

a first adjustable load circuit operably coupled to one tap of the first set of taps, wherein the first adjustable load circuit provides a first portion of the first impedance in response to the first impedance selection signal and provides a first portion of the second impedance in response to the second impedance selection signal;

a second adjustable load circuit operably coupled to a second tap of the first set of taps, wherein the second adjustable load circuit provides a second portion of the first impedance in response to the first impedance selection signal and provides a second portion of the second impedance in response to the second impedance selection signal;

a third adjustable load circuit operably coupled to one tap of the second set of taps, wherein the third adjustable load circuit provides a third portion of the first impedance in response to the first impedance selection signal and provides a third portion of the second impedance in response to the second impedance selection signal; and

a fourth adjustable load circuit operably coupled to a second tap of the second set of taps, wherein the fourth adjustable load circuit provides a fourth portion of the first impedance in response to the first impedance selection signal and provides a fourth portion of the second impedance in response to the second impedance selection signal.

23. (original) The RFIC of claim 16, wherein the radio front end further comprises:

a second adjustable load coupled to the first winding, wherein the second adjustable load provides a third impedance in response to the first impedance selection signal and provides a fourth impedance in response to the second impedance selection signal.

24. (original) A radio frequency integrated circuit (RFIC) comprises:

a radio front end operably coupled to transceiver radio frequency (RF) signals;

a low noise amplifier operably coupled to the radio front end, wherein the low noise amplifier receives inbound RF signals from the radio front end, and wherein the low noise amplifier amplifies the inbound RF signals to produce amplified inbound RF signals;

down conversion module operably coupled to convert the amplified inbound RF signals into inbound baseband signals;

baseband processing module operably coupled to convert the inbound baseband signals into inbound data and to convert outbound data into outbound baseband signals in accordance with a wireless communications protocol;

up conversion module operably coupled to convert the outbound baseband signals into outbound RF signals; and

a power amplifier operably coupled to amplify the outbound RF signals to produce amplified outbound RF signals and to provide the amplified outbound RF signals to the radio front end, wherein the radio front end includes:

a transformer having a first winding and a second winding, wherein the first winding is operably coupled to an antenna and the second winding coupled to at least one of a power amplifier and a low noise amplifier; and

an adjustable load operably coupled to the first winding, wherein the adjustable load provides a first impedance based on a first impedance selection signal when the radio front end is in a transmit mode and provides a second impedance based on a second impedance selection signal when the radio front end is in a receive mode such that impedance at the first winding is substantially similar in the transmit mode and in the receive mode.

25. (original) The RFIC of claim 24, wherein the adjustable load comprises:

a variable capacitor circuit operably coupled from a first node of the first winding to a second node of the first winding, wherein the variable capacitor circuit provides a first capacitance value in response to the first impedance selection signal and provides a second capacitance value in response to the second impedance selection signal

26. (original) The RFIC of claim 24, wherein the adjustable load comprises:

a variable inductor circuit operably coupled in series with one node of the first winding, wherein the variable inductor circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal.

27. (original) The RFIC of claim 24, wherein the adjustable load comprises:

a variable inductance circuit operably coupled from one node of the first winding to a circuit ground, wherein the variable inductance circuit provides a first inductance value in response to the first impedance selection signal and provides a second inductance value in response to the second impedance selection signal.

28. (original) The RFIC of claim 24, wherein the radio front end further comprises:

determining the load impedance selection signal based on at least one of: impedance matching of load on single-ending winding, output power requirements, and receiver sensitivity.

29. (original) The RFIC of claim 24, wherein the radio front end further comprises:

the second winding of the transformer includes a first set of taps and a second set of taps, wherein the first set of taps is coupled to a low noise amplifier and the second set of taps is coupled to a power amplifier;

a first adjustable load circuit operably coupled to one tap of the first set of taps, wherein the first adjustable load circuit provides a first portion of a third impedance in response to the first impedance selection signal and provides a first portion of a fourth impedance in response to the second impedance selection signal;

a second adjustable load circuit operably coupled to a second tap of the first set of taps, wherein the second adjustable load circuit provides a second portion of the third

impedance in response to the first impedance selection signal and provides a second portion of the fourth impedance in response to the second impedance selection signal;

a third adjustable load circuit operably coupled to one tap of the second set of taps, wherein the third adjustable load circuit provides a third portion of the third impedance in response to the first impedance selection signal and provides a third portion of the fourth impedance in response to the second impedance selection signal; and

a fourth adjustable load circuit operably coupled to a second tap of the second set of taps, wherein the fourth adjustable load circuit provides a fourth portion of the third impedance in response to the first impedance selection signal and provides a fourth portion of the fourth impedance in response to the second impedance selection signal.

30. (original) The RFIC of claim 24, wherein the radio front end further comprises.

a second adjustable load coupled to the second winding, wherein the second adjustable load provides a third impedance in response to the first impedance selection signal and provides a fourth impedance in response to the second impedance selection signal.